

Building a Better Plant

"Take-Off" Helps Plants Grow Faster, Mature Earlier, and Leave Fewer Contaminants in the Ground

Growing more and better food crops has traditionally meant pouring on the nitrogen fertilizer, which is expensive to use and pollutes waterways through runoff. This is not a good situation, especially now when the world needs to add biofuel production to a global agricultural system that is struggling to feed rapidly growing populations. Can we cost effectively produce more food and biofuel and do so without further degrading the environment?

Pat Unkefer and her team in Bioscience Division say yes, and they've got a product that proves it.

Take-Off, licensed by Biagro Western, is a metabolite, an amino acid that coordinates aspects of a plant's metabolism. It increases both the amount of carbon dioxide that the plant converts to carbohydrates and the amount of nitrogen it draws from the soil. When Take-Off is sprayed on crops, they grow faster, mature earlier, and leave less nitrogen fertilizer in the ground to contaminate water supplies. Plants treated with Take-Off also use more of their nitrogen for growth instead of storing it in their tissues.

Unkefer and her team discovered the metabolite—2-oxoglutaramate—while studying plant metabolism. They learned they could stimulate growth, without the use of hormones, by increasing a plant's supply of this naturally occurring substance.

Synthesizing 2-oxoglutaramate proved prohibitively expensive, however, so the team identified a cheaper compound of similar structure (an analog) that replicates the metabolite's function. It is that analog that is now on the market as Take-Off. The analog is biosynthesized and biodegradable and is thus a very eco-friendly technology, certifiable even for organic farming.

Take-Off is now being used commercially on wheat, barley, and grapes and on the biodiesel crop canola. It is significantly increasing overall yields, and is being developed for additional crops as well. The farmers are also realizing greater profitability, thus increasing their own sustainability.

In July the Federal Laboratory Consortium, a nationwide network of federal laboratories, honored Take-Off with a Notable Technology Development Award during a Denver meeting of regional members of the organization.